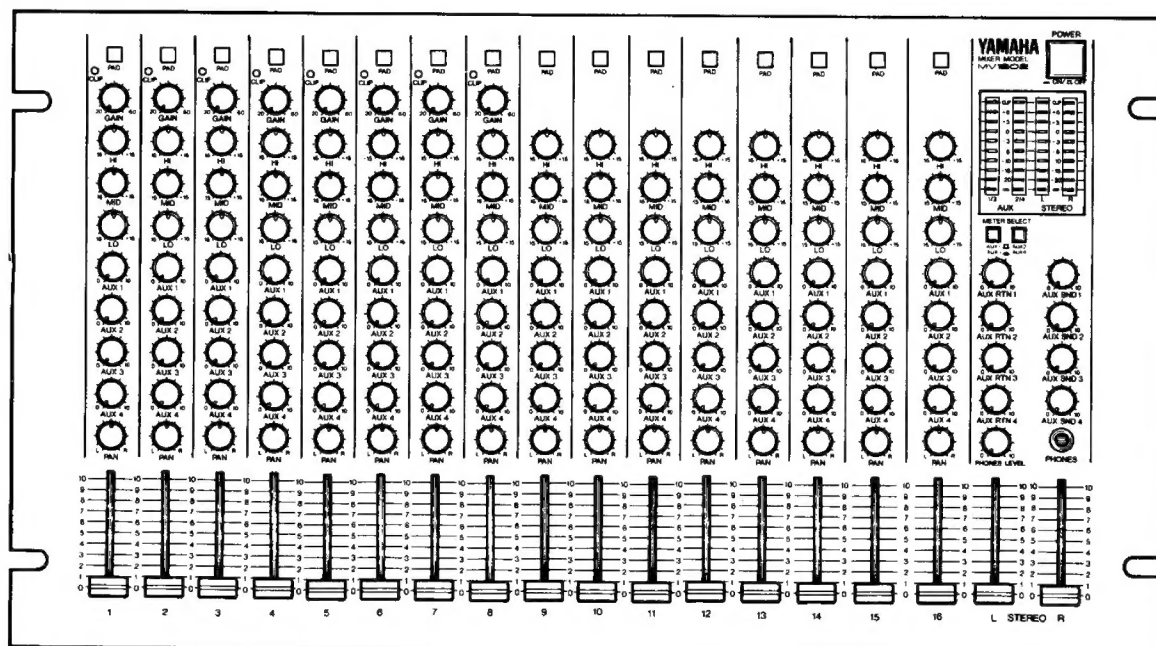


YAMAHA

MIXER
TABLE DE MIXAGE
MISCHPULT

MV1602

OPERATION MANUAL
MANUEL D'INSTRUCTIONS
BEDIENUNGSANLEITUNG



Congratulations!

You are the proud owner of a YAMAHA MV1602 Rack Mount Mixer. The MV1602 is a very versatile 19" rack-mountable mixer featuring:

- * 16 input channels.
- * 3-band EQ on each input channel.
- * Microphone-level input capability on channels 1 through 8.
- * Switchable input pads on all channels, and continuously variable gain trimmers on channels 1 through 8.
- * Channels 15 and 16 are true stereo channels.
- * Four auxiliary submixes with stereo returns.
- * Master auxiliary send and return level controls.
- * Stereo master program buss with independent L and R channel faders.
- * Balanced and unbalanced stereo program outputs.
- * 10-element LED stereo peak level meters.
- * 10-element LED peak meters switchable to read levels on all four auxiliary busses.
- * Cascade capability.

Of course, the MV1602 also offers the high standard of quality and great sound that YAMAHA is famous for. We urge you to read this operation manual thoroughly in order to make the most of the MV1602's many features and controls — and keep it in a safe place for later reference.

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PRECAUTIONS

1. AVOID EXCESSIVE HEAT, HUMIDITY, DUST AND VIBRATION

Keep the unit away from locations where it is likely to be exposed to high temperatures or humidity — such as near radiators, stoves, etc. Also avoid locations which are subject to excessive dust accumulation or vibration which could cause mechanical damage.

2. AVOID PHYSICAL SHOCKS

Strong physical shocks to the unit can cause damage. Handle it with care.

3. DO NOT OPEN THE CASE OR ATTEMPT REPAIRS OR MODIFICATIONS YOURSELF

This product contains no user-serviceable parts. Refer all maintenance to qualified YAMAHA service personnel. Opening the case and/or tampering with the internal circuitry will void the warranty.

4. MAKE SURE POWER IS OFF BEFORE MAKING OR REMOVING CONNECTIONS

Always turn the power OFF prior to connecting or disconnecting cables. This is important to prevent damage to the unit itself as well as other connected equipment.

5. HANDLE CABLES CAREFULLY

Always plug and unplug cables — including the AC cord — by gripping the connector, not the cord.

6. CLEAN WITH A SOFT DRY CLOTH

Never use solvents such as benzine or thinner to clean the unit. Wipe clean with a soft, dry cloth.

7. ALWAYS USE THE CORRECT POWER SUPPLY

Make sure that the power supply voltage specified on the rear panel matches your local AC mains supply.

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

IMPORTANT. The wires in this mains lead are coloured in accordance with the following code:

BLUE : NEUTRAL

BROWN : LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

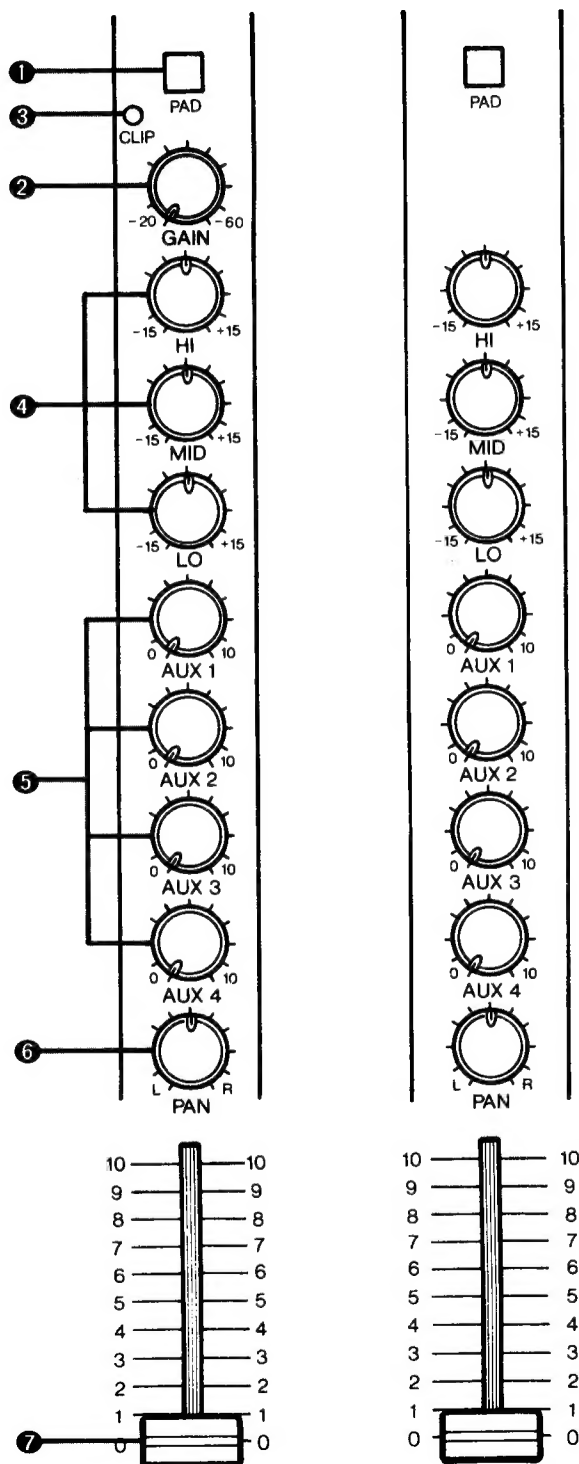
The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

FRONT PANEL CONTROLS


Input Channels

Channel 1 — 8

Channel 9 — 16



1 20dB Pad switch

This switch attenuates the signal applied to the corresponding channel input by 20 dB prior to the head amplifier. The 20dB switch effectively increases the range of input signal levels that can be handled by the mixer, preventing overloading of the input circuitry when receiving high-level signals. The pad is ON when the 20dB switch is in the  (lower) position.

STEREO CHANNEL NOTE:

On channels 15 and 16 (the MV1602 stereo channels), the 20dB pad switch simultaneously affects signals applied to the channel's L and R inputs.

2 GAIN Control (Channels 1 through 8 only.)

This control, provided on channels 1 through 8, adjusts the input sensitivity of the input between -60 dB (0.775 mV) and -20 dB (77.5 mV) when the 20dB pad switch is OFF, and between -40 dB and 0 dB when the 20dB switch is ON. Continuously variable gain control allows optimum matching with virtually any microphone, electric instrument or line source.

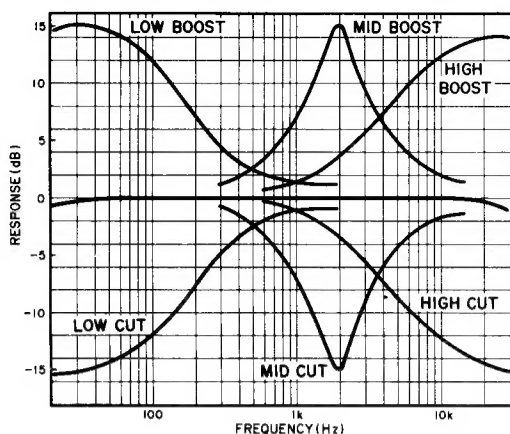
3 CLIP Indicator (Channels 1 through 8 only.)

The CLIP indicator LED lights when the signal applied to the corresponding channel's input reaches a level 3 dB below the clipping level of the mixer's input circuitry. If the CLIP indicator lights more than only briefly on high-level transients it is necessary to reduce the output level of the source connected to that channel's input, or use the 20dB pad switch to attenuate the incoming signal level.

4 3-band Equalizer

These controls permit individually modifying the response of each channel. The HI, MID and LO EQ controls function as follows:

Control	Range	Freq.	Type
HI	±15 dB	10 kHz	Shelving
MID	±15 dB	2 kHz	Peaking
LO	±15 dB	100 Hz	Shelving



STEREO CHANNEL NOTE:

On channels 15 and 16, the EQ controls simultaneously control the response of signals received via the channel's L and R inputs.

5 AUX 1, AUX 2, AUX 3 and AUX 4 Controls

The AUX 1 through AUX 4 controls determine the level of the signal sent from that channel to the correspondingly numbered master AUX SND control and rear-panel AUX SEND jack. The AUX controls can be used to determine the amount of signal from the corresponding channel sent to external effect devices, a performer's cue system, a monitor system, or other equipment fed by the appropriate AUX SEND jacks.

NOTE:

AUX 1 and AUX 2 are factory pre-wired for post-EQ/post-fader operation, so the AUX 1 and AUX 2 signals are affected by EQ and fader settings. Internal jumpers allow the AUX 1 and AUX 2 controls to be rewired for pre-EQ/pre-fader or post-EQ/pre-fader operation if required (refer this job to qualified YAMAHA service personnel).

NOTE:

AUX 3 and AUX 4 are factory pre-wired for pre-EQ/pre-fader operation, so the AUX 3 and AUX 4 signals are not affected by EQ or fader settings. Internal jumpers allow the AUX 1 and AUX 2 controls to be rewired for post-EQ/pre-fader or post-EQ/post-fader operation if required (refer this job to qualified YAMAHA service personnel).

STEREO CHANNEL NOTE:

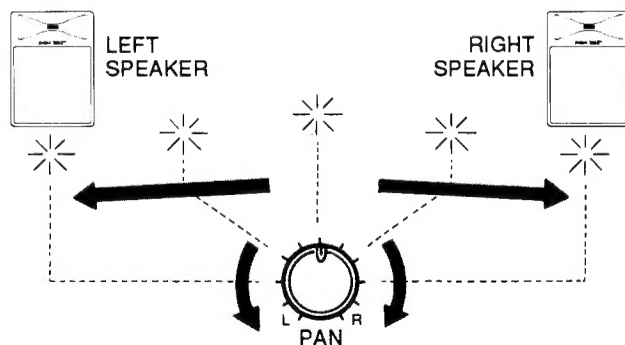
On channels 15 and 16, the AUX controls simultaneously send signals received via the channel's L and R inputs to the appropriate AUX busses.

6 PAN Control

The PAN control determines the position in the stereo sound field at which the sound from that channel is heard. Rotated fully counterclockwise the channel signal will be delivered from the left output only, and will be heard at the far left of the stereo sound field. If the PAN control is turned fully clockwise, the sound from that channel will appear at the far right of the stereo sound field. If the PAN control is set at its center position, the channel signal will be sent equally to both the left and right channels, causing the sound to appear at the center of the sound field. Intermediate PAN control settings cause the sound to be heard at the corresponding position.

STEREO CHANNEL NOTE:

On channels 15 and 16, the PAN controls function more like "BALANCE" controls, adjusting the balance between the left- and right-channel signals.



7 Channel Fader

This is the main level control for each input channel. It determines the level of the signal sent from the corresponding input channel to the master stereo buss. The settings of the 16 input faders determines the "mix" or balance of sound levels between the instruments or other sources connected to the inputs.

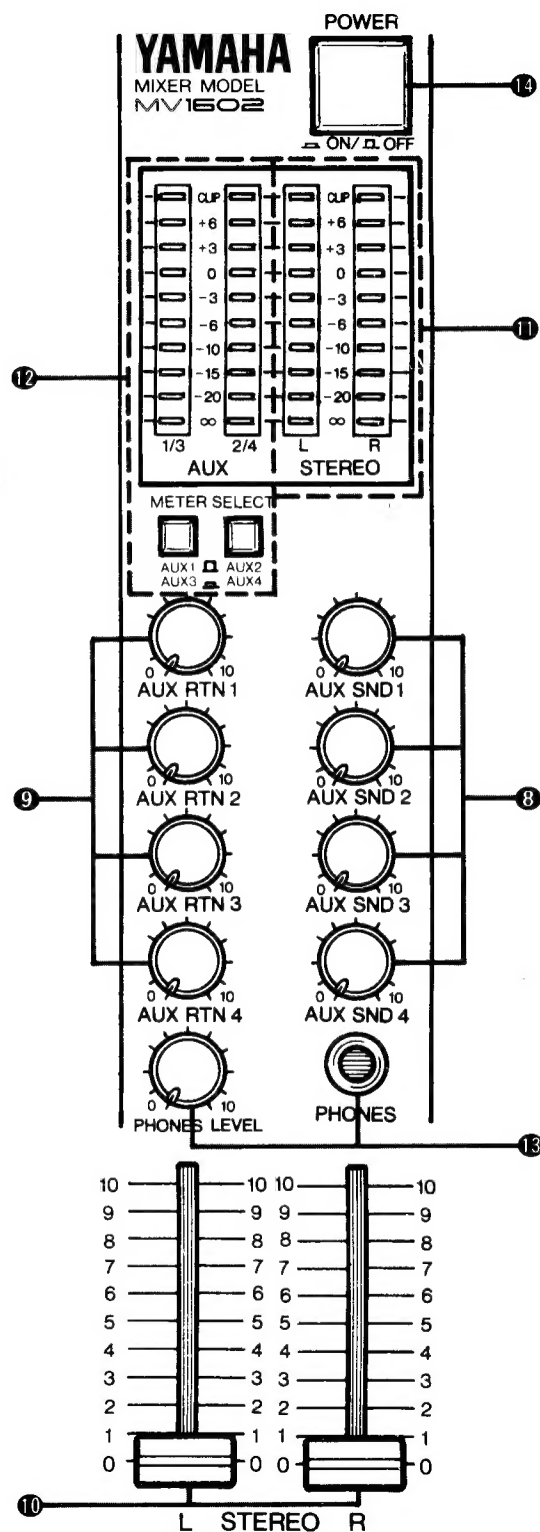
NOTE:

If a channel is not being used, its fader should be set to the lowest position ("0" on the scale) to prevent unwanted noise from being added to the main program signal.

STEREO CHANNEL NOTE:

On channels 15 and 16, the channel fader simultaneously controls the levels of signals received via the channel's L and R inputs.

Master Control Section



⑧ AUX SND 1, 2, 3 and 4 Controls

These adjust the overall output level of the AUX 1, AUX 2, AUX 3 and AUX 4 “mixes” set up using the AUX 1 through AUX 4 controls on channels 1 through 16. AUX SND 1 sets the overall level of the AUX 1 mix signal appearing at the AUX SEND 1 jack, AUX SND 2 sets the overall level of the AUX 2 mix signal appearing at the AUX SEND 2 jack, and so on. These controls should be used to optimally match the AUX SEND output level of the MV1602 to the input sensitivity of the signal processing device, amplifier or other equipment used.

⑨ AUX RTN 1, 2, 3 and 4 Controls

These controls adjust the level of the signal received at the rear-panel AUX RETURN jacks and mixed into the main stereo program. Since stereo AUX returns are provided, all four AUX RTN controls are “ganged” types, simultaneously controlling the AUX RTN levels to the left and right stereo buss.

⑩ STEREO L and R Master Faders

The STEREO L and R faders independently adjust the level of the signal sent from the left and right master stereo busses to the L and R STEREO OUT connectors.

⑪ STEREO L and R Level Meters

The MV1602 features independent 10-element LED peak level meters for the left and right channels. The LED elements correspond to levels of ∞ , -20, -15, -10, -6, -3, 0, +3, and +6 dB. The topmost “CLIP” elements are provided to warn of possible overload distortion. If either of the CLIP elements lights more than just occasionally on high-level peaks, the channel fader levels or levels of the sources connected to the mixer’s inputs should be reduced.

⑫ AUX 1/3 and 2/4 Level Meters and METER SELECT Switches

10-element LED peak level meters (∞ , -20, -15, -10, -6, -3, 0, +3, and +6 dB) are also provided for AUX buss level monitoring. The AUX 1/3 meter displays signal levels on the AUX 1 buss or AUX 3 buss, depending on the setting of the METER SELECT switch immediately below it, and the AUX 2/4 meter displays signal levels on the AUX 2 or AUX 4 buss, depending

on the setting of the METER SELECT switch immediately below it. The topmost “CLIP” elements are provided to warn of possible overload distortion. If either of the CLIP elements lights more than just occasionally on high-level peaks, the AUX control levels should be reduced.

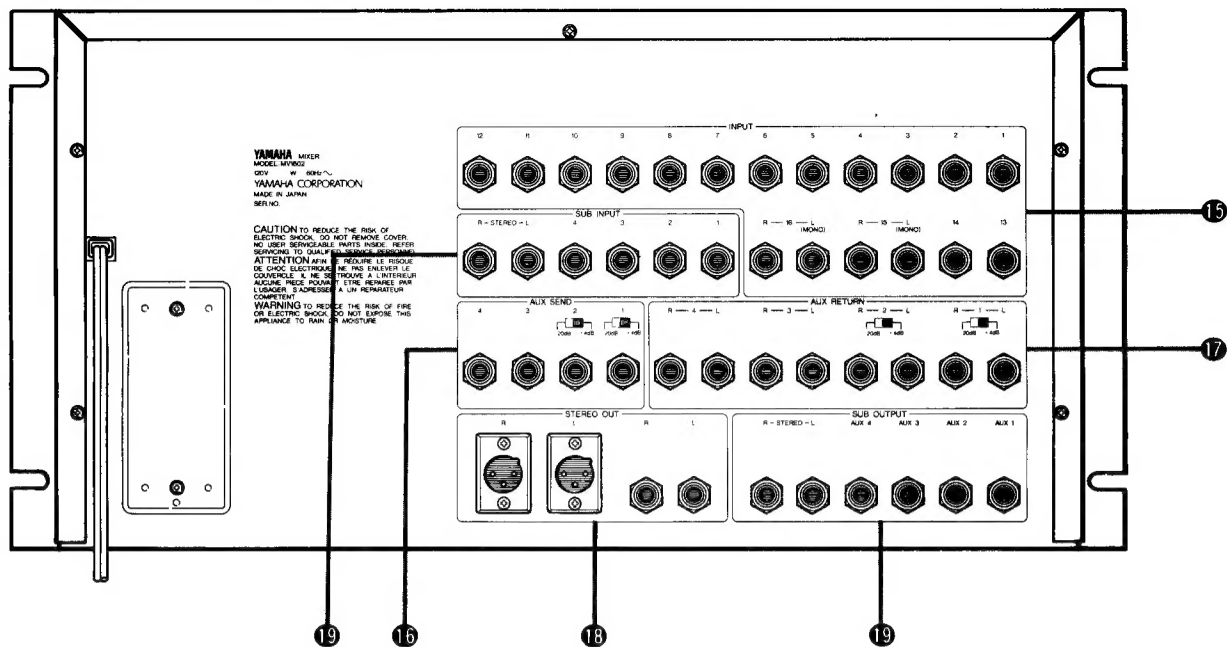
⑬ LEVEL Control and PHONES Jack

The PHONES jack delivers the master stereo program signals to a pair of 8 — 40 ohm stereo monitor headphones. The LEVEL control adjusts the headphone monitoring level.

⑭ POWER Switch

Press once to turn power ON, and a second time to turn power OFF. The “ ∞ ” LEDs of the stereo level meter will light when the power is ON.

REAR PANEL CONNECTORS AND CONTROLS



15 INPUT Jacks 1 — 16 (L and R on channels 15 and 16)

These 1/4" phone jacks accept input from electric and electronic instruments, or any other line-level source. Channels 1 through 8 will also accept a wide range of microphone-level input signals. Refer to the "INPUT CHARACTERISTICS" chart in the "SPECIFICATIONS" section of this manual for input level and impedance details.

STEREO CHANNEL NOTE:

Since channels 15 and 16 are designed to handle stereo signals, they have two input jacks each (L and R) rather than the single input jacks provided on all other channels.

16 AUX SEND 1, 2, 3, 4 Jacks and 1, 2 Level Switches

These 1/4" phone jacks deliver the AUX 1, AUX 2, AUX 3 and AUX 4 mixes, respectively, to feed an external signal processor, monitor system or other equipment. AUX SEND 1 and 2 are equipped with an output level switch that allows selection of -20 dB or +4 dB nominal output level. AUX SEND 3 and 4 are fixed at +4 dB. All four AUX SENDs are designed to driver 600 ohm lines.

17 AUX RETURN 1, 2, 3, 4 (L and R) Jacks and 1, 2 Level Switches

The mono or stereo output from external signal processing equipment fed by the AUX OUT jacks can be returned to the main stereo program mix via these 1/4" phone jacks. The AUX RETURN jacks can also be used to add signals from external sources to the MV1602's stereo program buss. Note that each AUX RETURN offers independent return inputs for the left and right busses, accomodating the return signal from effect units featuring stereo outputs. AUX RETURN 1 and 2 are equipped with an input level switch that allows selection of -20 dB or +4 dB nominal input level for both the L and R inputs. AUX RETURN 3 and 4 are fixed at +4 dB. All four AUX RETURNS present a load impedance of 600 ohms.

18 STEREO OUT L & R Jacks/Connectors

The MV1602 provides both unbalanced phone jack and balanced XLR connector outputs from the main stereo buss. The signal delivered is a stereo mix of the input channel signals and the signals returned to the AUX RETURN jacks. The STEREO OUT signal will normally be used to drive a power amplifier and speaker system, powered keyboard speakers or a main house mixing console. Nominal output level/load

impedance for the unbalanced phone jack outputs is +4 dB/10 k-ohms. Nominal output level/load impedance for the balanced XLR connectors is +4 dB/600 ohms.

NOTE:

The MV1602 XLR connectors are wired according to DIN specifications. Pin 1 is shield (ground), pin 2 is hot (signal high) and pin 3 is cold (signal low).

19 SUB IN and SUB OUT Jacks

These twelve jacks permit "cascading" two MV1602's to increase the number of available input channels to 32. When two MV1602's are cascaded, one functions as a sub-mixer and the second as a master mixer. The input channels on the sub-mixer operate normally but the master section controls are not used. The input channels of the master mixer also function normally, and its master section controls the entire system. That is, the STEREO L and R faders, AUX SND

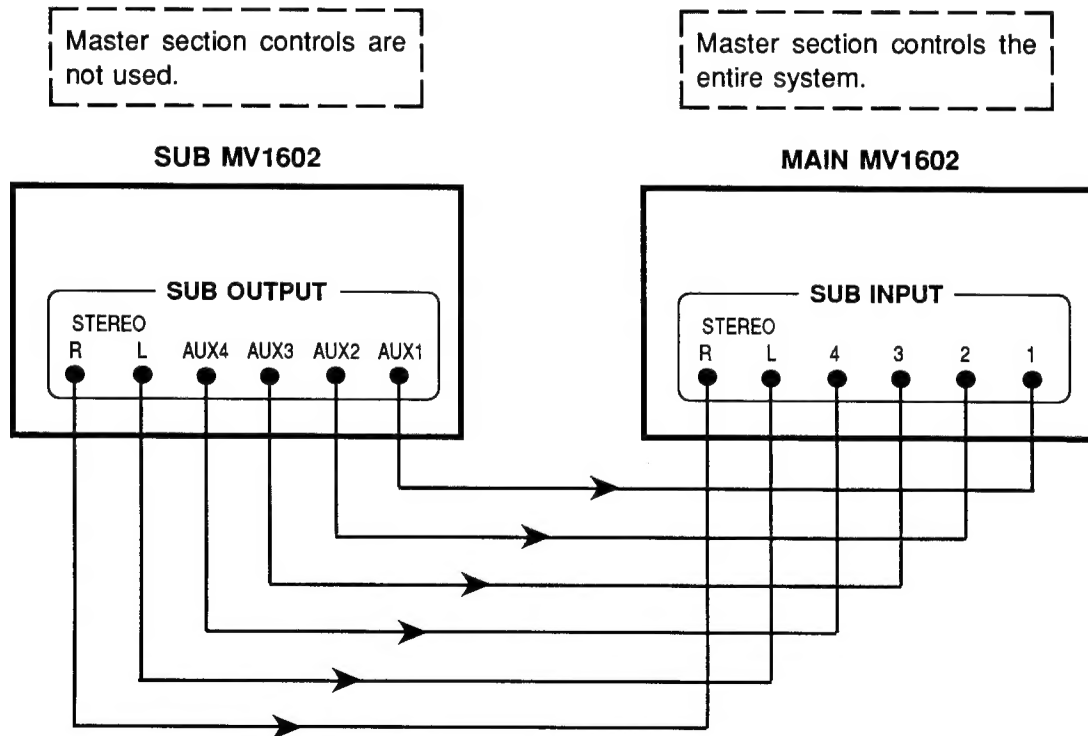
and AUX RTN controls of the master mixer function for all 32 input channels.

The SUB IN jacks provide direct inputs to the console's left and right stereo busses and four AUX busses. Their nominal input level/impedance is -6 dB/600 ohms. The output level/impedance of the corresponding SUB OUT jacks is -6 dB/600 ohms. In order to cascade two MV1602's, the SUB OUT jacks of one console (the sub-mixer) are connected to the corresponding SUB IN jacks of the second console (the master mixer).

The diagram below shows the proper connections:

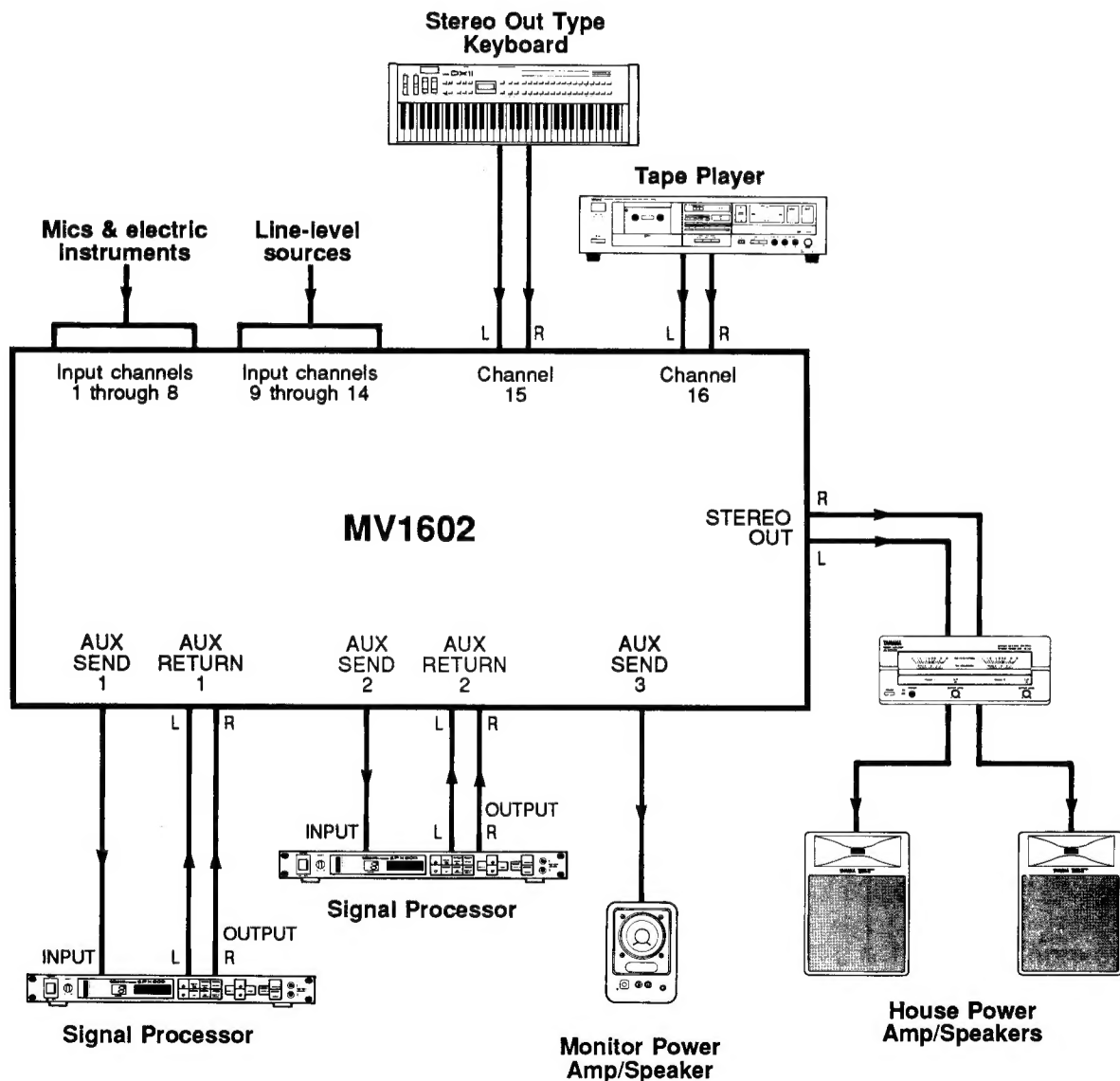
NOTE:

During normal single mixer operation the L, R and AUX 1 through AUX 4 SUB IN jacks can be used to add external line-level signals into the corresponding stereo master and AUX busses.

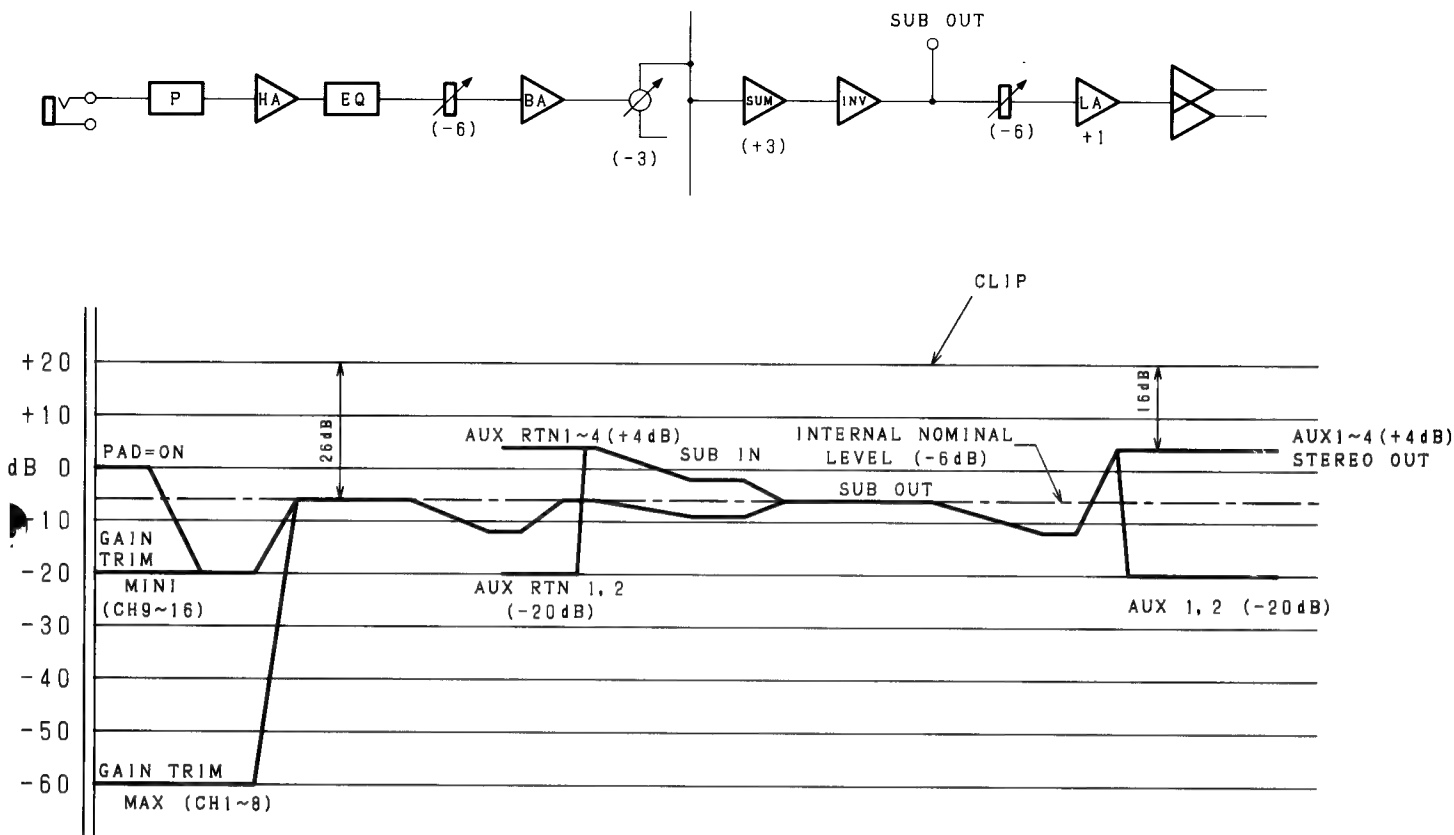


SYSTEM EXAMPLE

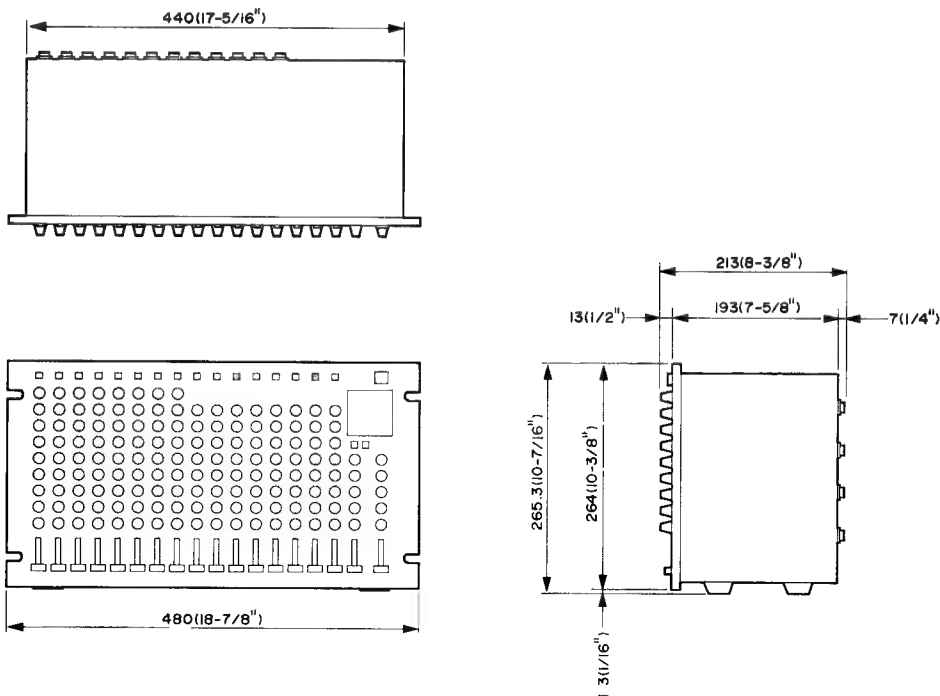
The general-purpose sound reinforcement system shown here is only one example of the many possible system configurations and applications. In the example, microphone and electric instrument (e.g. electric guitar) sources are connected to input channels 1 through 8, while any required line-level sources such as electronic keyboards are connected to input channels 9 through 14. Stereo input channels 15 and 16 receive the stereo signal from a stereo out type keyboard and tape player, respectively, to provide background music for intermission, recorded accompaniment for the live program, etc. AUX SEND 1 and 2 feed separate signal processors, allowing two different effects to be independently applied to the various sources. AUX SEND 3 feeds a monitor system, and AUX SEND 4 is left spare. The STEREO OUTs are connected to the main house amplifier and speaker system.



LEVEL DIAGRAM



DIMENSIONS



UNIT = mm (inch)

SPECIFICATIONS

Frequency Response

+1, -3 dB, 20 Hz — 20 kHz, 600 ohms, +4 dB

Total Harmonic Distortion

Less than 0.1%, 20 Hz — 20 kHz, 600 ohms, +14 dB

Hum & Noise* (20 Hz — 20 kHz, $R_s = 150$ ohms, Input gain = Max., Input pad = 0 dB, Input sensitivity = -60 dB)

- 123dB Equivalent input noise.
- 90 dB (STEREO) Residual output noise.
- 86 dB (AUX 1—4) Residual output noise.
- 74 dB (78 dB S/N) at STEREO OUT, Master fader nominal, all channel faders minimum.
- 59 dB (63 dB S/N) at STEREO OUT, Master fader nominal, one channel (1 — 8) fader nominal.
- 69 dB (73 dB S/N) at AUX SEND, Master level control nominal, all channel mix level control minimum.
- 59 dB (63 dB S/N) at AUX SEND, Master level control nominal, one channel (1 — 8) mix level control nominal.

Maximum Voltage Gain

- 76 dB CH1 — 8 IN to STEREO OUT
- 36 dB CH9 — 16 IN to STEREO OUT
- 76 dB CH1 — 8 IN to AUX SEND 1, 2
- 82 dB CH1 — 8 IN to AUX SEND 3, 4
- 12 dB AUX RETURN 1, 2 to STEREO OUT
- 16 dB SUB IN to STEREO OUT, AUX SEND 1—4

Crosstalk

- 60 dB at 1 kHz, adjacent channel inputs.
 - 60 dB at 1 kHz, input to output.
-

Input Channel Gain Control (CH1 — 8)

40 dB (-60 — -20 dB) variation in gain stop to stop.

Input Channel Pad Switch (CH1 — 16)

0/20 dB of attenuation.

Input Channel Equalization (CH1 — 16)

- 15 dB maximum boost or cut
- HIGH: 10 kHz (shelving)
- MIDDLE: 2 kHz (peaking)
- LOW: 100 Hz (shelving)

Meters (0 VU = + 4 dB or 1.23 Vrms Output level 4LED Bargraph Meters)

- #1: STEREO L
- #2: STEREO R
- #3: AUX 1/3
- #4: AUX 2/4

Clip Indicators

- CLIP (red) lights (CH 1— 8) when pre-EQ signal is 3 dB below clipping.
- CLIP (red) lights (Bargraph Meter) when post-Master fader signal is 3 dB below clipping.

Power Requirement

- U.S. & Canadian Models: 120 V AC, 60 Hz
- General Model: 220/240 V AC, 50/60 Hz

Power Consumption

- U.S. & Canadian Models: 40 watts
- General Model: 36 watts

Dimensions (W x H x D)

- 480 x 265.3 x 213 mm
- (18-7/8" x 10-7/16" x 8-3/8")

Weight

- U.S. & Canadian Models: 7.9 kg (17 lbs. 7 oz)
 - General Model: 7.8 kg (17 lbs. 3 oz)
-

* Measured with a -6 dB/octave LPF @ 12.7 kHz.

● 0 dB = 0.775 Vrms

■ INPUT CHARACTERISTICS

Input terminals	PAD SW	Gain Trim	Actual Load Impedance	For Use With Nominal	Input Level			Connector In Mixer		
					Sensitivity*	Nominal	Maximum before clip			
CH 1 – 8 Input	OFF (0 dB)	–60dB	10 kohms	50–600 ohms Mics & 600 ohms Lines	–72dB (0.19mV)	–60dB (0.8mV)	–34dB (15.5mV)	Phone jack		
	ON (20 dB)	–20dB			–32dB (19.5mV)	–20dB (77.5mV)	+6dB (1.55V)			
						–12dB (195mV)	0dB (775mV)		+26dB (15.5V)	
CH 9 – 14 Input	OFF (0 dB)		20 kohms	600 ohms Lines	–32dB (19.5mV)	–20dB (77.5mV)	+6dB (1.55V)	Phone jack		
	ON (20 dB)				–12dB (195mV)	0dB (775mV)	+26dB (15.5V)			
CH 15, 16 Input (Stereo)	OFF (0 dB)		20 kohms	600 ohms Lines	–32dB (19.5mV)	–20dB (77.5mV)	+6dB (1.55V)	Phone jack		
	ON (20 dB)				–12dB (195mV)	0dB (775mV)	+26dB (15.5V)			
AUX RTN 1, 2 (Stereo)			20 kohms	600 ohms Lines	–2dB (616mV)	+4dB (1.23V)	+26dB (15.5V)	Phone jack		
						–20dB (77.5mV)	+6dB (1.55V)			
AUX RTN 3, 4 (Stereo)			20 kohms	600 ohms Lines	–2dB (616mV)	+4dB (1.23V)	+26dB (15.5V)	Phone jack		
SUB IN STEREO (L, R) AUX (1 – 4)			20 kohms	600 ohms Lines	–12dB (195mV)	–6dB (388mV)	+20dB (7.75V)	Phone jack		

■ OUTPUT CHARACTERISTICS

Output terminals	Actual Source Impedance	For Use With Nominal	Output Level		Connector In Mixer
			Nominal	Maximum before clip	
STEREO OUT (L, R)	150 ohms	600 ohms Lines	+4dB (1.23V)	+20dB (7.75V)	XLR-3-32 type
	600 ohms	10 kohms Lines	+4dB (1.23V)	+20dB (7.75V)	Phone jack
AUX SEND 1, 2	150 ohms	600 ohms Lines	+4dB (1.23V)	+20dB (7.75V)	Phone jack
			–20dB (77.5mV)	+6dB (1.55V)	
AUX SEND 3, 4	150 ohms	600 ohms Lines	+4dB (1.23V)	+20dB (7.75V)	Phone jack
SUB OUT STEREO (L, R) AUX (1 – 4)	600 ohms	10 kohms Lines	–6dB (388mV)	+20dB (7.75V)	Phone jack
PHONES OUT	68 ohms	8 ohms Phones	1 mW	20 mW	STEREO Phone jack
		40 ohms Phones	3 mW	130 mW	

- 0 dB = 0.775 V
- All Phone Jacks are unbalanced.
- XLR type connectors are balanced.

* Sensitivity is the lowest level that will produce an output of 0 dB (0.775 V), or the nominal output level when the unit is set to maximum gain.



SERVICE

This product is supported by YAMAHA's worldwide network of factory trained and qualified dealer service personnel. In the event of a problem, contact your nearest YAMAHA dealer.

ENTRETIEN

L'entretien de cet appareil est assuré par le réseau mondial YAMAHA de personnel d'entretien qualifié et formé en usine des concessionnaires. En cas de problème, prendre contact avec le concessionnaire YAMAHA le plus proche.

KUNDENDIENST

Für dieses Gerät steht das weltweite YAMAHA Kundendienstnetz mit qualifiziertem, werksgeschultem Personal zur Verfügung. Bei Störungen und Problemen wenden Sie sich bitte an Ihren YAMAHA-Händler.

YAMAHA